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PATENT

IBM/145DV1
Confirmation No. 3332

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

Applicant: Mark Kenneth Hoffmeyer et al. Art Unit: 2827
Serial No.: 09/924,711 Examiner: Jose H. Alcala
Filed: August 8, 2001 Atty. Docket No.: IBM/145DV1
For: PROCESSING OF CIRCUIT BOARDS WITH PROTECTIVE, ADHESIVE-
LESS COVERS ON AREA ARRAY BONDING SITES

AMENDMENT AND RESPONSE

Box NON-FEE AMENDMENT
Assistant Commissioner for Patents
Washington, DC 20231

Sir:

In reply to the Office Action dated March 13, 2002, the following amendments
and remarks are provided:

Amendments

In the Claims

Please amend claims 11 and 19 to read as follows:

11. (Once Amended) An assembly comprising:
- a circuit board;
 - an area array bonding site on a surface of the circuit board; and
 - a protective cover overlaying the bonding site, the protective cover being non-conductive throughout at least a region thereof that overlays the bonding site, and the protective cover removably registered to the bonding site by a plurality of posts secured to one of the protective cover and the circuit board into a plurality of apertures disposed in the other of the protective cover and the circuit board.

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19. (Once Amended) A cover for protecting an area array bonding site on a surface of a circuit board, the circuit board having a plurality of apertures, the cover comprising:

a base member having a first face and second face, the base member shaped to at least correspond to said area array bonding site, and the base member being non-conductive throughout at least a region thereof that is configured to overlay the bonding site; and

a plurality of posts coupled to the first face and registered for said plurality of apertures.

Please add the following new claims 23-32:

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23. (New Claim) The assembly of claim 11, wherein the plurality of posts are secured to the protective cover, and wherein the plurality of apertures are disposed in the circuit board.

24. (New Claim) The assembly of claim 11, wherein the protective cover is formed of a non-conductive material.

25. (New Claim) The assembly of claim 24, wherein the protective cover is formed of epoxy glass.

26. (New Claim) The assembly of claim 11, further comprising a graspable extension disposed on a surface of the protective cover opposite that which overlays the bonding site.

27. (New Claim) The assembly of claim 11, wherein each of the plurality of posts includes a diametral slot.

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28. (New Claim) The assembly of claim 11, wherein the protective cover has a thickness of about 0.006 to about 0.008 inches.

29. (New Claim) The assembly of claim 11, wherein the protective cover further includes a recess overlaying the bonding site.

30. (New Claim) The cover of claim 19, wherein the base member is formed of a non-conductive material.

31. (New Claim) The cover of claim 30, wherein the base member is formed of epoxy glass.

32. (New Claim) The cover of claim 19, wherein the base member has a thickness of about 0.006 to about 0.008 inches.

REMARKS

This paper is submitted in reply to the Office Action dated March 13, 2002, within the three-month period for response. Reconsideration and allowance of all pending claims are respectfully requested.

In the subject Office Action, claims 11-12 were rejected under 35 U.S.C. § 102(b) as being anticipated by U.S. Patent No. 5,049,084 to Bakke and claims 19-22 were rejected under 35 U.S.C. § 102(b) as being anticipated by U.S. Patent No. 5,550,713 to Pressler et al.

Applicants respectfully traverse the Examiner's rejections to the extent that they are maintained. Applicants have amended claims 11 and 19, and have added new claims 23-32. Applicants respectfully submit that no new matter is being added by the above amendments, as the amendments are fully supported in the specification, drawings and claims as originally filed. Attached hereto is a marked-up version of the changes made to

the claims by the current amendment. The attachment is captioned "Version with Markings to Show Changes Made."

Now turning to the subject Office Action, and specifically to the rejection of independent claim 11, this claim recites an assembly comprising a circuit board, an area array bonding site on a surface of the circuit board, and a protective cover overlaying the bonding site. The protective cover is removably registered to the bonding site by a plurality of posts secured to one of the protective cover and the circuit board into a plurality of apertures disposed in the other of the protective cover and the circuit board.

As described in the Application, the structure of claim 11 is used to protect sensitive area array bonding sites from contamination during manufacture, and prior to mounting of active surface mounted components such as integrated circuit (IC) packages. In this regard, claim 11 has been amended to clarify that the protective cover is non-conductive throughout at least a region thereof that overlays the bonding site, support for which may be found on page 8 of the application. This amendment has been made to clarify the principal nature of the cover as a temporary, protective device used during manufacture of a circuit board to protect a bonding site from contamination by various manufacturing processes such as screen printing and wave soldering, etc.

In rejecting claim 11, the Examiner relies upon Bakke, which discloses an assembly including a circuit board with an array area bonding site, and an area array interconnect 12 (see Fig. 1) which is utilized to interconnect contact pads disposed on the circuit board with opposing contact pads disposed on a second circuit board. The interconnect is aligned with the first circuit board via a plurality of alignment posts disposed on the circuit board, and engaged via apertures disposed in the interconnect.

The Examiner analogizes the interconnect 12 to a protective cover. It should be noted, however, that the interconnect 12 is not utilized during manufacture to protect an overlaid area array bonding site, so this interconnect is not analogous to a "protective cover" as is recited in claim 11. Instead, the interconnect is utilized to provide electrical interconnection between opposing contact pads on circuit boards 14, 16. In this regard,

the interconnect includes a plurality of dumbbell-shaped interconnect elements extending through a non-conductive support member (see, e.g., the Abstract and Figs. 3-6).

The orientation of interconnect elements throughout the interconnect in Bakke thus renders the interconnect conductive throughout much of the region of the interconnect that overlays the bonding site on the circuit board. Accordingly, Bakke also does not disclose a protective cover that is "non-conductive throughout at least a region thereof that overlays the bonding site" as is required by claim 11. Claim 11 is therefore novel over Bakke.

Moreover, claim 11 is non-obvious over Bakke, and the other prior art of record, given that there is no suggestion to modify Bakke to provide a non-conductive region that overlays a bonding site. As discussed above, the principal use of the interconnect in Bakke is to provide electrical interconnection between opposing circuit boards. Modifying the Bakke interconnect to be non-conductive in a region that overlays a bonding site would render the interconnect unsatisfactory for its intended purpose, as no electrical interconnect would be possible with the bonding site through the non-conductive region. It is well settled that a proposed modification cannot render a prior art invention unsatisfactory for its intended purpose. MPEP 2143.01. Therefore, claim 11 as amended is also non-obvious over Bakke and the other prior art of record. Reconsideration and allowance of claim 11, as well as of claim 12 which depends therefrom, are respectfully requested.

Next, with respect to independent claim 19, this claim recites a cover for protecting an area array bonding site on a surface of a circuit board, where the circuit board has a plurality of apertures. The cover includes a base member having a first face and a second face, and shaped to at least correspond to the area array bonding site. The cover additionally includes a plurality of posts coupled to the first face and registered for the plurality of apertures.

As with claim 11, claim 19 has been amended to clarify that the base member is non-conductive throughout at least a region thereof that is configured to overlay the

bonding site. Thus, the principal nature of the cover as a temporary, protective device used during manufacture of a circuit board to protect the bonding from contamination has also been highlighted in this claim.

In rejecting claim 19, the Examiner relies upon Pressler et al., which the Examiner argues discloses a cover 82 for protecting an area array bonding site disposed on a surface of a printed circuit board 52. The Examiner analogizes a plurality of screws 110 to a plurality of posts that are registered with a plurality of apertures in the circuit board.

However, as is discussed in the Abstract of Pressler et al., Pressler et al. is directed to an electromagnetic shielding assembly for a printed circuit board, and as such, cover 82 is intended for use during the normal operation of the assembly, and is not used to protect a bonding site during manufacture. Furthermore, given that the cover 82 is utilized to provide electromagnetic shielding, the cover is by necessity formed of a conductive material (see column 5, lines 12-20). Therefore, Pressler et al. does not disclose a base member that is "non-conductive throughout at least a region thereof that is configured to overlay the bonding site" as is required by claim 19. Claim 19 is therefore novel over Pressler et al.

Moreover, claim 19 is non-obvious over Pressler et al. and the other art of record, as there is no suggestion in the art to modify Pressler et al. to utilize a non-conductive region that overlays a bonding site. Given its nature as an electromagnetic interference shield, there simply would be no motivation to modify the shield of Pressler et al. to form a non-conductive region overlaying a bonding site. As with Bakke, any such modification to Pressler et al. would render the Pressler et al. shield unsatisfactory for its intended purpose, and as such, the art cannot be read to suggest such a modification. MPEP 2143.01. Claim 19 is therefore non-obvious over Pressler et al. and the other prior art of record, and reconsideration and allowance of this claim, as well as of claims 20-22 which depend therefrom, are respectfully requested.

As a final matter, Applicants have added new claims 23-32, all of which depend from claim 11 or claim 19, thus rendering these claims patentable for the reasons

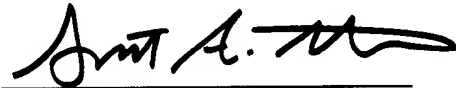
discussed above. Support for these new claims may be found, for example, in Fig. 1 (for claim 23), at page 8, line 20 (for claims 24-25 and 30-31), in claims 20-22 (for claims 26-27 and 29), and at page 9, line 1 (for claims 28 and 32). Consideration and allowance of these claims are respectfully requested.

In summary, Applicants respectfully submit that all pending claims are novel and non-obvious over the prior art of record. Reconsideration and allowance of all pending claims are therefore respectfully requested. If the Examiner has any questions regarding the foregoing, or which might otherwise further this case onto allowance, the Examiner may contact the undersigned at (513) 241-2324. Moreover, if any other charges or credits are necessary to complete this communication, please apply them to Deposit Account 23-3000.

Respectfully submitted,

6 JUNE 2002

Date



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